IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A ceramic substrate[[,]] ~~for a semiconductor producing/examining device~~[[,]] having a conductor ~~formed~~ inside thereof, ~~or on the surface thereof~~

wherein the ceramic substrate is a sintered aluminum nitride substrate having ~~wherein said ceramic substrate has been sintered such that~~ a fractured section ~~thereof exhibits~~ with intergranular fracture.

Claim 2 (Currently Amended): The ceramic substrate ~~for a semiconductor producing/examining device~~ according to claim 1,

wherein an average diameter of ceramic grains of said fractured section is 0.5 to 10 μm.

Claim 3 (Currently Amended): The ceramic substrate ~~for a semiconductor producing/examining device~~ according to claim 1,

wherein an impurity element is locally distributed in boundaries of ceramic grains of said fractured section.

Claim 4 (Currently Amended): The ceramic substrate ~~for a semiconductor producing/examining device~~ according to claim 1,

wherein the thermal conductivity of said ceramic substrate is 100 W/m·K or more.

Claim 5 (Currently Amended): The ceramic substrate ~~for a semiconductor producing/examining device~~ according to claim 1, having

~~wherein said ceramic substrate is constituted such that~~:

an impurity-existent area where an impurity element is locally distributed in triple points of crystal grains, and

an impurity element-nonexistent area where an impurity is not locally distributed in the triple points of the crystal grains[[,]]

~~coexist therein~~.

Claim 6 (New): The ceramic substrate according to claim 1,

wherein said ceramic substrate has a diameter of 200 mm or more.

Claim 7 (New): The ceramic substrate according to claim 1,

wherein said ceramic substrate has a diameter of 300 mm or more.

Claim 8 (New): The ceramic substrate according to claim 1,

wherein said ceramic substrate has a thickness of 25 mm or less.

Claim 9 (New): The ceramic substrate according to claim 3,

wherein said impurity element is at least one selected from the group consisting of boron, sodium, calcium, silicon and a sintering aid.

Claim 10 (New): The ceramic substrate according to claim 3,

wherein said impurity element is at least one selected from the group consisting of Si, Y and O.

Claim 11 (New): The ceramic substrate according to claim 5,

wherein said impurity element is at least one selected from the group consisting of boron, sodium, calcium, silicon and a sintering aid.

Claim 12 (New): The ceramic substrate according to claim 5,

wherein said impurity element is at least one selected from the group consisting of Si, Y and O.

Claim 13 (New): A semiconductor producing/examining device comprising the ceramic substrate according to Claim 1.

Claim 14 (New): A ceramic substrate comprising a conductor on a surface thereof,

wherein the ceramic substrate is a sintered aluminum nitride substrate having a fractured section with intergranular fracture.

Claim 15 (New): The ceramic substrate according to claim 14,

wherein an average diameter of ceramic grains of said fractured section is 0.5 to 10 μm.

Claim 16 (New): The ceramic substrate according to claim 14,

wherein an impurity element is locally distributed in boundaries of ceramic grains of said fractured section.

Claim 17 (New): The ceramic substrate according to claim 14,

wherein the thermal conductivity of said ceramic substrate is 100 W/m·K or more.

Claim 18 (New): The ceramic substrate according to claim 14, having

an impurity-existent area where an impurity element is locally distributed in triple points of crystal grains, and

an impurity element-nonexistent area where an impurity is not locally distributed in the triple points of the crystal grains.

Claim 19 (New): The ceramic substrate according to claim 14,

wherein said ceramic substrate has a diameter of 200 mm or more.

Claim 20 (New): The ceramic substrate according to claim 14,

wherein said ceramic substrate has a diameter of 300 mm or more.

Claim 21 (New): The ceramic substrate according to claim 14,

wherein said ceramic substrate has a thickness of 25 mm or less.

Claim 22 (New): The ceramic substrate according to claim 16,

wherein said impurity element is at least one selected from the group consisting of boron, sodium, calcium, silicon and a sintering aid.

Claim 23 (New): The ceramic substrate according to claim 16,

wherein said impurity element is at least one selected from the group consisting of Si, Y and O.

Claim 24 (New): The ceramic substrate according to claim 18,

wherein said impurity element is at least one selected from the group consisting of boron, sodium, calcium, silicon and a sintering aid.

Claim 25 (New): The ceramic substrate according to claim 18,

wherein said impurity element is at least one selected from the group consisting of Si, Y and O.

Claim 26 (New): A semiconductor producing/examining device comprising the ceramic substrate according to Claim 14.

BASIS FOR THE AMENDMENT

Claims 1-26 are active in the present application. Claim 1 has been amended to require that claimed ceramic substrate has a conductor formed inside or on a surface of an aluminum nitride substrate. Claim 1 has been further amended to remove the alternate form of conductor placement on the substrate. New independent Claim 14 includes the previous limitation of conductor placement from Claim 1. Support for the amendment is found on page 12, lines 14-16 and in the Examples (see, for example, Example 1 on page 35, lines 12-13 wherein aluminum nitride powder is used to form the substrate). The claims have been amended to remove the intended use limitation from the preamble. Claims 6-26 are new claims. Support for new Claim 6 is found on page 11, lines 31-32. Support for new Claim 7 is found on page 11, lines 32-33. Support for new Claim 8 is found on page 12, lines 1-2. Support for new Claim 9 is found on page 6, lines 2-8. Support for new Claim 10 is found on page 6, lines 17-20. Support for new Claim 11 is found on page 6, lines 2-8. Support for new Claim 12 is found on page 6, lines 17-20. Support for new Claim 13 is found in the original claims. Support for new independent Claim 14 is found in original Claim 1. Support for new dependent Claims 15-26 is found in Claims 2-13. No new matter is believed to have been added by this amendment.

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Williams for the helpful and courteous discussion of January 6, 2004. During the discussion, Applicants U.S. representative presented arguments that the claimed ceramic substrate is novel and not obvious in view of the prior art relied upon by the Office as evidenced by the requirement that the presently claimed ceramic substrate have a conductor formed inside or on a surface of a sintered aluminum nitride substrate having an intergranular fracture section.

The presently claimed invention is drawn to a sintered aluminum nitride ceramic substrate that has a fractured section having an intergranular fracture (page 5, last line through page 6, first line). Sintering of the ceramic substrate causes fracturing which may generate a crack that winds along the boundaries of the grains thus giving the ceramic substrate excellent thermal shock resistance (page 8, lines 7-16). Annealing treatment permits impurities to be removed from the crystal grains and segregates them along the grain boundaries (page 9, lines 2-6).

The presence of an intergranular fracture can be determined by electron microscopy at high magnification. A fracture surface that is complicated distinguishes the fracture from an *intra*granular fracture which has relatively flat fracture surfaces (page 10, lines 14-22). Pictures of an intergranular and intragranular fracture surfaces are shown as Figures 14 and 15, respectively (Example 1 and Comparative Example 1, respectively). The difference in grain structure at the fracture surface is readily evident.

The specification as originally filed contains a comparison of ceramic substrates having intergranular vs. intragranular fracture (see Examples 1-5 and Comparative Example 1 tabulated in Table 1 on page 50 – reproduced below for convenience).

	Fracture Toughness value ($MPa \cdot m^{1/2}$)	Thermal Conductivity (W/mK)	Fractured Section
Example 1	3.	180	intergranular fracture
Example 2	4.0	190	intergranular fracture
Example 3	3.5	185	intergranular fracture
Example 4	3.0	180	intergranular fracture
Example 5	3.1	180	intergranular fracture
Comparative Example 1	2.5	85	intragranular fracture

Boxed row represents a ceramic substrate that does not have intergranular fracture.

As is readily evident from the data in the Table above, the ceramic substrate having intragranular fracture is unable to provide the thermal conductivity or fracture toughness of the inventive examples. Applicants have therefore shown that a ceramic substrate having intergranular fracture instead of intragranular fracture can provide significantly superior physical properties such as thermal conductivity and fracture toughness.

The Office rejected original Claims 1 and 3 as anticipated under 35 U.S.C. § 102(b) in view of a patent to Koichi (JP 11-236270). Applicants traverse the rejection at least on the grounds that the prior art compact is not disclosed to have intergranular fracture.

The sintered compact of Koichi is disclosed to be made of silicon nitride (see paragraph [0001] of the English machine translation). Nowhere in Koichi is it stated that the Koichi sintered compact must contain aluminum nitride and nowhere is it disclosed that the prior art substrate have a fractured section having intergranular fracture. In fact, in paragraphs [0003] and [0004] of Koichi aluminum nitride is disparaged.

Applicants have demonstrated that fracture toughness and suppression of crack extension is improved in the claimed ceramic substrate and the claimed ceramic substrate therefore has excellent thermal shock resistance (page 8, lines 7-18). Koichi nowhere discloses or suggests that such improvements may be obtained by using aluminum nitride in the prior art sintered compact.

Applicants further traverse the rejection in view of the amendment to Claim 1 which limits the claimed ceramic substrate to those substrates which have a conductor formed inside or on a surface of an aluminum nitride substrate since Koichi is silent to the presence of aluminum nitride in the prior art sintered compact.

The Office rejected Claims 2, 4 and 5 as obvious under 35 U.S.C. § 103(a) in view of Koichi in combination with Naoto (JP 9-30866). Naoto discloses a sintered compact having a silicon nitride material. Naoto does not disclose a sintered compact or ceramic substrate having an aluminum nitride substrate conductor.

Since neither of Koichi or Naoto disclose or suggest an element of the presently claimed invention, the prior art relied upon by the Examiner cannot anticipate or render obvious the presently claimed invention.

Applicants submit that the amendment to the claims places all now-pending claims in condition for allowance. Applicants respectfully request the withdrawal of the rejections and the passage of all now-pending claims to Issue.

Applicants submitted a Request for Priority Under 35 U.S.C. § 119 upon entering the national stage. In the Office Action of July 8, 2003, the Office did not acknowledge priority under 35 U.S.C. § 119. Applicants respectfully request the Examiner acknowledge priority in the next communication from the Office.

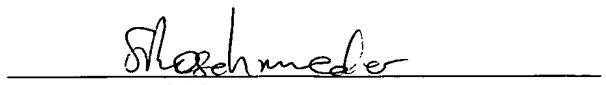
Applicants submit concurrently herewith new drawing sheets including sheets 1-12. Applicants request the Examiner indicate that the new drawing sheets are acceptable in the next communication from the Office.

Applicants submitted an Information Disclosure Statement including a List of Related Cases citing one pending application on December 9, 2003. Applicants respectfully request the IDS be acknowledged as considered in the examination of the above-identified

application by return of a signed, initialed and dated copy of the List of Related Cases in the next communication from the Office.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Norman F. Oblon
Attorney of Record
Registration No. 24,618

Stefan U. Koschmieder, Ph.D.
Registration No. 50,238

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)

NFO/SUK:sjh